

emission part is used as the thin film electron source provided with a cold cathode having a crystalline thin film of electron emissive material formed by means of the above-mentioned cold cathode forming process. Thereby, the above-mentioned structure is effective to realize the reduced cost with the structure simpler than the conventional structure. The electron emission element having the above-mentioned structure is fabricated reproducibly, and the dispersion between elements is less, and the increased current density is realized as the multi source. Therefore, the electron emission element can be used as a high brightness and fine CRT electron source. Furthermore, a transparent substrate is used as the substrate and transparent conducting material is used as the material of the crystalline orientation film to realize a transparent flat display.

The object and advantage of the present invention will be more apparent by examples described hereinafter with reference to the drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a schematic partial cross sectional view showing one example of a conventional field effect type electron emission element.

FIG. 2 is a cross sectional view showing the structure of an electron emission element in accordance with an embodiment 1 of the present invention.

FIG. 3A is a structural diagram showing a thin film forming equipment used in the process of the present invention.

FIG. 3B is a diagram for describing a phenomenon that occurs between a deposition substrate and a target.

FIG. 4A to FIG. 4C are electron microscope photographs of a thin film obtained by means of a process in accordance with the embodiment 1 of the present invention.

FIG. 5 is a diagram showing an X-ray diffraction measurement result of a thin film obtained by means of a process in accordance with the embodiment 1 of the present invention.

FIG. 6 is a diagram for describing the mechanism of crystal structure control.

FIG. 7 is a cross sectional view showing the structure of an electron emission element in accordance with an embodiment 2 of the present invention.

FIG. 8 is a cross sectional view showing the structure of a flat display in accordance with an embodiment 3 of the present invention.

FIG. 9 is a cross sectional view showing the structure of a transmission type flat display in accordance with the embodiment 4 of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

An electron emission element and a process for fabrication of the electron emission element will be described hereinafter in detail with reference to FIG. 2 to FIG. 6.

FIG. 2 is a cross sectional view showing the structure of an electron emission element of the present invention. In FIG. 2, 21 denotes a substrate consisting of Si, 22 denotes an insulating layer consisting of oxide film such as SiO_2 or